CASE REPORT

The woman with unexplained anaemia

Nada Al-Hadithy, James Coelho, Mark Gorman, Christopher Stone

Plastic Surgery Department,
Royal Devon and Exeter
Hospital, Exeter, UK

Correspondence to
Nada Al-Hadithy,
nadaul@yahoo.com

Accepted 19 November 2015

SUMMARY

A 77-year-old woman was admitted to hospital for 3 weeks to treat cellulitis and investigate unexplained anaemia. Earlier, when her neck had been examined on outpatient review of her lymphoedema, a large fungating tumour had been noted. This was biopsied and found to be a mixed basaloid adenocarcinoma. She was subsequently admitted under the plastic surgeons and treated with wide local excision on postero-lateral neck dissection. The defect was reconstructed with a deltopectoral flap.

BACKGROUND

We present a case of a woman with very much for considering this case report. The authors feel it is important to share, since the woman had a massive fungating tumour on her neck; the tumour was not detected despite a 3-week inpatient stay. This case is important as it highlights the importance of top-to-toe clinical examination when anaemia is investigated.

The discussion also brings information to light on a plastic surgery procedure, for clinicians who might not have seen these procedures.

CASE PRESENTATION

A 77-year-old previously fit and well woman with a history of essential hypertension, hypercholesterolaemia and lymphoedema was admitted to hospital for investigations of ongoing anaemia and hypokalaemia, complicated by new onset atrial fibrillation with bilateral leg cellulitis. After 3 weeks as an inpatient for treatment of cellulitis with intravenous antibiotics and examination of systems, the possibility of an underlying malignancy was raised on account of a microcytic anaemia and clinical assessment. There was no known prior episode of gastrointestinal bleeding, gastritis, non-steroidal anti-inflammatory drug or corticosteroid use, alcohol use or cirrhosis.

Serum iron studies were carried out demonstrating low iron and ferritin with high total iron binding capacity. This confirmed an iron deficiency anaemia. The patient was discharged with outpatient endoscopy and colonoscopies booked.

She was subsequently seen at an outpatient clinic for review of bilateral lymphoedema and, when asked to examine her jugular venous pressure, the dermatologist noted a large 20 cm fungating tumour in the left posterior triangle of the neck (figures 1–3). This was the first time this lesion had been seen despite the recent inpatient event. Apparently, the patient had been hiding it from everyone, including her husband, under her scarf, for several years.

INVESTIGATIONS

The lesion was biopsied, but the bleeding could not be controlled so the patient was admitted under the plastic surgeons, who had an MRI performed, which demonstrated the tumour to envelop the left external jugular vein (figures 4 and 5). The patient underwent CT staging and no distant macroscopic metastases were identified.

Histopathology revealed the lesion to be a basal cell carcinoma (BCC) and she was admitted under the plastic surgeons for a planned excision, en bloc dissection of posterior lateral triangle of the neck and delayed deltopectoral fascial flap (figures 6–8).

The histology revealed a mixed carcinoma, both basal cell and adenocarcinoma, on the left of the neck, extending into the skeletal muscle and measuring 14 cm at its widest diameter. One lymph node, involved with the neck dissection, however, appeared to be a direct extension of the tumour rather than of lymphatic spread. The specialist multi disciplinary team recommended adjuvant radiotherapy.

DIFFERENTIAL DIAGNOSIS

BCC, squamous cell carcinoma, adenocarcinoma and melanoma.

TREATMENT

The flap was inset 1 month later and the donor site resurfaced with a split thickness skin graft. There was a postoperative complication of delayed wound healing of one tip of the flap and the skin graft was slow to heal.

The tumour was subsequently found to be excised with a 6 mm margin peripherally and deep; adjuvant radiotherapy was found to be unnecessary.

OUTCOME AND FOLLOW-UP

The patient remains under clinical follow-up.

Figure 1 Clinical image of mass anteriorly.

To cite: Al-Hadithy N, Coelho J, Gorman M, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2015-210363

Figure 2 Clinical image of mass anteriorly with ruler.

DISCUSSION

Iron deficiency anaemia occurs in 2–5% of adult men and post-menopausal women in the developed world, and is a common cause of referral to gastroenterologists (4–13% of referrals). The aim of treatment is to attend to any undiscovered underlying cause and to restore haemoglobin concentrations and red cell indices to normal, and replenish iron stores. Excision of the tumour and eradication of the bleeding source prevented further iron loss in our case, however, iron supplementation was necessary to correct the anaemia and to replenish body stores. This was achieved by administration of ferrous sulfate 200 mg twice daily.

Basal cell carcinoma

BCC, first described by Jacob in 1827,¹ is the most common malignant neoplasm in humans.² It is a slow growing, locally invasive malignant epidermal skin tumour predominantly affecting Caucasians. It is more prevalent after the fourth decade of life and its peak incidence is at the sixth decade, it has a male preponderance. Metastasis is extremely rare and morbidity results from local tissue invasion and destruction particularly on the face, head and neck.

About one-third of BCC occurs on sun protected area, suggesting factors other than solar exposure playing a role, such as genetic susceptibility. The most significant aetiological factors appear to be genetic predisposition and exposure to UV radiation.³ The sun-exposed areas of the head and neck are the most commonly involved sites.⁴ Increasing age, male sex, fair skin types I and II, immunosuppression and arsenic exposure are other recognised risk factors,⁵ and a high dietary fat intake may be relevant.⁶

Figure 3 Clinical photograph of neck from left lateral side.

Figure 4 MRI of neck.

The morphology is diverse, and includes nodular, cystic, superficial, morphoeic (sclerosing), keratotic and pigmented variants. Common histological subtypes include nodular BCC, superficial BCC and pigmented forms, in addition to morphoeic, micronodular, infiltrative and basosquamous variants, which are particularly associated with aggressive tissue invasion and destruction.⁷

This tumour was reported as a mixed carcinoma of basal cell and adenocarcinoma, which is an extremely rare variant. Essentially, it is a BCC with differentiation towards adnexal structures, which can include sebaceous, follicular, eccrine and apocrine structures. The histology report was mainly descriptive, as not all tumours fall within clear diagnostic categories. As this was such a rare tumour, it was difficult for the consultant histopathologist to give information as to the natural history of the tumour.

Surgical excision is a highly effective treatment for primary BCC,^{8,9} with a recurrence rate of <2% reported 5 years following histologically complete excision in two different series.^{8,10} The overall cosmetic results are generally good,⁹ particularly when excision and wound repair are performed by experienced practitioners.

Studies using horizontal (Mohs micrographic surgery) sections, which can accurately detect BCC at any part of the surgical margin, suggest that excision of small (<20 mm)

Figure 5 MRI of head and neck.

Figure 6 Low power microscopy of histopathology slide of tumour.

well-defined lesions with a 3 mm peripheral surgical margin will clear the tumour in 85% of cases. A 4–5 mm peripheral margin will increase the peripheral clearance rate to approximately 95%, indicating that approximately 5% of small, well-defined BCCs extend over 4 mm beyond their apparent clinical margins.^{11–13} Although few data exist on the correct deep surgical margin, as this will depend on the local anatomy, excision through subcutaneous fat is generally advisable. Morphoeic and large BCCs require wider surgical margins in order to maximise the chance of complete histological resection. For primary morphoeic lesions, the rate of complete excision with increasing peripheral surgical margins is as follows: 3 mm margin, 66%; 5 mm margin, 82%; 13–15 mm margin, >95%.^{11 14}

Not all incompletely excised BCC will recur. Studies using approximately 2 to 5 years of follow up have reported recurrence rates of 30% to 41% following histologically incomplete excision.¹⁵

Recurrent BCC is more difficult to cure than primary disease—the results of all published series on the surgical excision of BCC show cure rates following treatment of recurrent disease that are inferior to those for primary lesions.¹⁶ Recurrent lesions generally require wider peripheral surgical margins than do primary lesions with or without standard (non-Mohs) frozen section control. Peripheral excision margins for recurrent BCC of 5–10 mm have been suggested.¹⁷ Mortality from BCC is very rare and tends to occur when presentation is very late.

Figure 7 Histopathology slide of lymph node.

Figure 8 Medium power microscopy of histopathology slide of tumour.

Deltopectoral fascial flap

Fasciocutaneous flaps raised from the anterior chest wall below the clavicle are well suited to reconstructing skin defects in the head and neck region in terms of proximity, skin texture and skin colour. Tissues of the pectoral area, such as skin and pectoralis major muscle, are used in safe and extended flaps for cervical and neck reconstructions. As blood supply is derived from medial vessels (internal mammary artery) or lateral (thoracodorsal and lateral thoracic arteries), two different flaps can be constructed: medial and lateral deltopectoral flaps. A medial deltopectoral flap was developed by Bakamjian as an axial-pattern skin flap in 1965.¹⁸ The blood supply depends on perforating branches from the internal mammary artery. A lateral deltopectoral flap based on lateral pedicles (from axilla and lateral thoracic area) has also been described.¹⁹

A deltopectoral flap located medial to the deltopectoral groove (junction between pectoralis and deltoid muscles) has a reliable axial blood supply. This is based on paired internal mammary arteries that arise from the subclavian artery and course inferiorly on the inside of the rib cage approximately 1 cm lateral to the sternum. The perforating branches of the internal mammary arteries emerge about 7 mm lateral to the sternum through five or six intercostal spaces; they are 0.25–3.5 mm in diameter. The so-called ‘principal perforator’ traverses the second intercostal space; the mean diameters of this artery and vein are just over 1.8 mm.²⁰ The vessels subsequently course laterally to provide blood supply to the pectoralis major muscle and overlying skin; the second–fourth perforators send branches to the breast. The blood vessels to the fasciocutaneous flap run in a plane superficial to the fascia that covers the pectoralis major and deltoid muscles; hence the importance of raising these flaps in a plane deep to the deltoid and pectoral fasciae.

Three angiosomes (arterial/vascular territories) are included when extending a deltopectoral flap laterally over the deltoid

First angiosome: Internal mammary arteries perforators extend from the lateral border of the sternum up to close to the deltopectoral groove (this area also receives some blood supply from musculocutaneous perforators arising from the pectoralis major muscle)

Second angiosome: A small but variable region of skin below the clavicle and medial to the deltopectoral groove is supplied by the thoracoacromial artery via a small direct cutaneous artery

Third angiosome: The area over the deltoid muscle is supplied by musculocutaneous perforators arising from the deltoid branch of the thoracoacromial artery and the anterior circumflex humeral artery.

Taylor and Palmer²¹ showed that, with the *angiosome concept*, the blood supply of the main angiosome and adjacent angiosome (second angiosome) is reliable, but that an additional angiosome, such as that over the deltoid muscle, is at risk of undergoing ischaemic necrosis. Once a deltopectoral flap is extended lateral to the deltopectoral groove, its reliability is diminished.

More dominant supply vessels to the second and third angiosomes increase the risk of necrosis in the third/distal angiosome once these supply vessels are divided, and the flap becomes dependent only on the vessels from the first angiosome. The further laterally the flap is raised the more random and unreliable the vascular supply, and the less reliable the flap becomes. If very large deltoid perforators are therefore encountered when elevating the distal part of the flap, one should be more inclined to delay the flap, as *delaying* or *supercharging* the flap lateral to the deltopectoral groove improves survival of its distal part, as was the case with our patient.

The DP flap has largely been supplanted by the pectoralis major, free tissue transfer and, to a lesser extent, latissimus dorsi flaps. It may, however, be useful in specific situations when other options are unavailable or have been exhausted. Contraindications include an internal mammary artery that has previously been used for coronary artery bypass surgery; and prior trauma or surgery (mastectomy, pacemaker, pectoralis major flap) to the anterior chest wall.

Advantages

Provides large area of skin cover
Better colour and texture match than those of free tissue transfer flaps from distant sites
Less bulky than pectoralis major flap
Technical simplicity

Learning points

- ▶ When patients are admitted into hospital a top-to-toe examination is necessary—especially if there is a concern of anaemia of unknown cause or occult malignancy.
- ▶ Basal cell carcinomas are the most common skin malignancies and can lead to anaemia if fungating and bleeding.
- ▶ Standard CT would not have picked up microscopic metastasis. Single-photon emission CT (SPECT-CT) could have been considered. SPECT-CT imaging involves the acquisition of a low dose, non-contrast, non-diagnostic CT scan immediately prior to SPECT imaging, which uses a rotating gamma camera. It is usually performed in nuclear medicine as an adjunct to standard single plane, gamma camera imaging, as a useful problem solving tool for interpretation of difficult imaging.
- ▶ Deltopectoral flaps are effective and reliable ways of resurfacing the posterior triangle of the neck.

Disadvantages

Limited arc of rotation
Fasciocutaneous pedicle limits the reach of the flap
Unsightly donor defect especially if skin graft is required (figure 5)

Anaesthesia and preparation

General anaesthesia
Paralysis acceptable as there are no major nerves in the surgical field
Supine position with padding/bag under the shoulders

Contributors All the authors contributed to this document. NA-H and CS provided perioperative care for this patient and worked on writing the manuscript. JC and MG worked on the manuscript.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Jacob A. Observations respecting an ulcer of peculiar character, which attacks the eyelids and other parts of the face. *Dublin Hosp Rep Commun Med Surg* 1827;4:232–9.
- 2 Miller SJ. Biology of basal cell carcinoma (part I). *J Am Acad Dermatol* 1991;24:1–13.
- 3 Gailani MR, Leffell DJ, Ziegler A *et al*. Relationship between sunlight exposure and a key genetic alteration in basal cell carcinoma. *J Natl Cancer Inst* 1996;88:349–54.
- 4 Roenigk RK, Ratz JL, Bailin PL, *et al*. Trends in the presentation and treatment of basal cell carcinomas. *J Dermatol Surg Oncol* 1986;12:860–5.
- 5 Zak-Prelisch M, Narbutt J, Sysa-Jedrzejowska A. Environmental risk factors predisposing to the development of basal cell carcinoma. *Dermatol Surg* 2004;30:248–52.
- 6 McNaughton SA, Marks GC, Green AC. Role of dietary factors in the development of basal cell cancer and squamous cell cancer of the skin. *Cancer Epidemiol Biomarkers Prev* 2005;14:1596–607.
- 7 Costantino D, Lowe L, Brown DL. Basosquamous carcinoma—an under-recognized, high-risk cutaneous neoplasm: case study and review of the literature. *J Plast Reconstr Aesthet Surg* 2006;59:424–8.
- 8 Walker P, Hill D. Surgical treatment of basal cell carcinomas using standard postoperative histological assessment. *Australas J Dermatol* 2006;47:1–12.
- 9 Marchac D, Papadopoulos O, Duport G. Curative and aesthetic results of surgical treatment of 138 basal-cell carcinomas. *J Dermatol Surg Oncol* 1982;8:379–87.
- 10 Griffiths RW, Suvarna SK, Stone J. Do basal cell carcinomas recur after complete conventional surgical excision? *Br J Plast Surg* 2005;58:795–805.
- 11 Breuninger H, Dietz K. Prediction of subclinical tumor infiltration in basal cell carcinoma. *J Dermatol Surg Oncol* 1991;17:574–8.
- 12 Wolf DJ, Zitelli JA. Surgical margins for basal cell carcinoma. *Arch Dermatol* 1987;123:340–4.
- 13 Kimyai-Asadi A, Alam M, Goldberg LH, *et al*. Efficacy of narrow-margin excision of well-demarcated primary facial basal cell carcinomas. *J Am Acad Dermatol* 2005;53:464–8.
- 14 Telfer NR, Colver GB, Morton CA. Guidelines for the management of basal cell carcinoma. *Br J Dermatol* 2008;159:35–48.
- 15 De Silva SP, Dellon AL. Recurrence rate of positive margin basal cell carcinoma: results of a five-year prospective study. *J Surg Oncol* 1985;28:72–4.
- 16 Rowe DE, Carroll RJ, Day CL. Mohs surgery is the treatment of choice for recurrent (previously treated) basal cell carcinoma. *J Dermatol Surg Oncol* 1989;15:424–31.
- 17 Burg G, Hirsch RD, Konz B, *et al*. Histographic surgery: accuracy of visual assessment of the margins of basal-cell epithelioma. *J Dermatol Surg Oncol* 1975;1:21–4.
- 18 Bakamjian VY. A two-stage method for pharyngoesophageal reconstruction with a primary pectoral skin flap. *Plast Reconstr Surg* 1965;36:173–84.
- 19 Güerriassi JO. Lateral deltopectoral flap: a new and extended flap. *J Craniofac Surg* 2009;20:885–8.
- 20 Rosson GD, Holton LH, Silverman RP, *et al*. Internal mammary perforators: a cadaver study. *J Recon Microsurg* 2005;21:239–42.
- 21 Taylor GI, Palmer JH. The vascular territories (angiosomes) of the body: experimental study and clinical applications. *Br J Plast Surg* 1987;40:113–41.

Copyright 2015 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow